

Version
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Digital Direction Finder R&S DDF® 100M

118 MHz to 250 MHz

- ◆ Direction finding of signals with almost any modulation
- ◆ Wide-aperture behaviour above 150 MHz with DF Antenna R&S® ADD 090 and R&S® ADD 090M
- ◆ Excellent DF accuracy even without error correction
- ◆ AC supply or battery operation



ROHDE & SCHWARZ



The system allows direction finding of signals with any modulation. Three operating modes can be selected:

- ◆ DF1: direction finding of a single frequency with moving average and 100 ms minimum signal duration (only versions without interference canceller, order no. x.12 and x.14)
- ◆ DF2: quasi-simultaneous direction finding on two frequency channels – one fixed channel, e.g. channel 16 (156.8 MHz), and another channel between 118 MHz and 250 MHz. The bearings of both frequencies are output with an update rate of 1/s. For a reliable interception of signals on both frequencies, the DF system will dwell on each frequency for 300 ms
- ◆ DF3: same as DF1 but higher sensitivity due to longer measurement time (minimum signal duration 600 ms)

Design

In coastal areas, land-based stations and vessels communicate on defined radio channels in the VHF range. For vessel traffic management, Rohde&Schwarz developed the Digital VHF/UHF Direction Finder R&S DDF® 100M which consists of the following equipment:

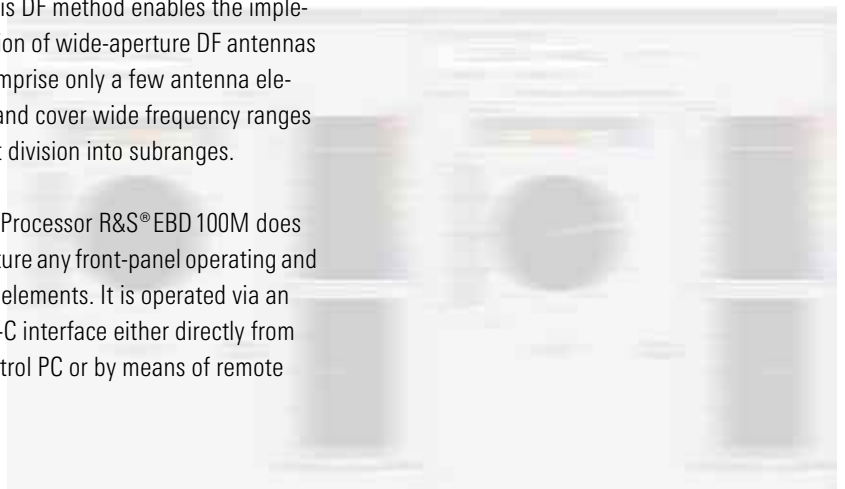
- ◆ VHF DF Antenna R&S® ADD 090 or R&S® ADD 090M (118 MHz to 250 MHz)
- ◆ DF Processor R&S® EBD 100M
- ◆ Monitoring Receiver R&S® ESMB as DF receiver
- ◆ Cable Set R&S DDF® 190Z (on request)

For sites with interference problems, a version with integrated canceller module (ICM) is available.

Characteristics and operation

The Digital Direction Finder R&S DDF® 100M operates according to the advanced correlative interferometer method. The bearing is taken using digital signal processing methods by comparing the complex antenna voltages of the signals received with reference values, and checking them for maximum correlation. This DF method enables the implementation of wide-aperture DF antennas that comprise only a few antenna elements and cover wide frequency ranges without division into subranges.

The DF Processor R&S® EBD 100M does not feature any front-panel operating and display elements. It is operated via an RS-232-C interface either directly from the control PC or by means of remote control.

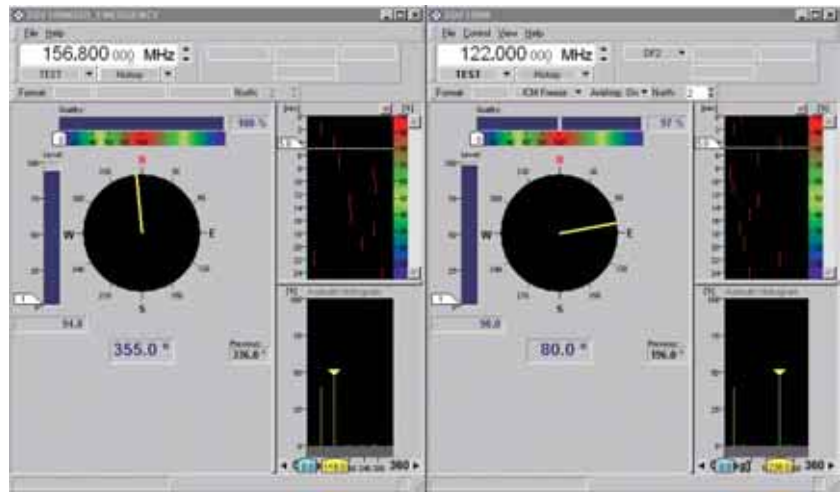


Interfaces

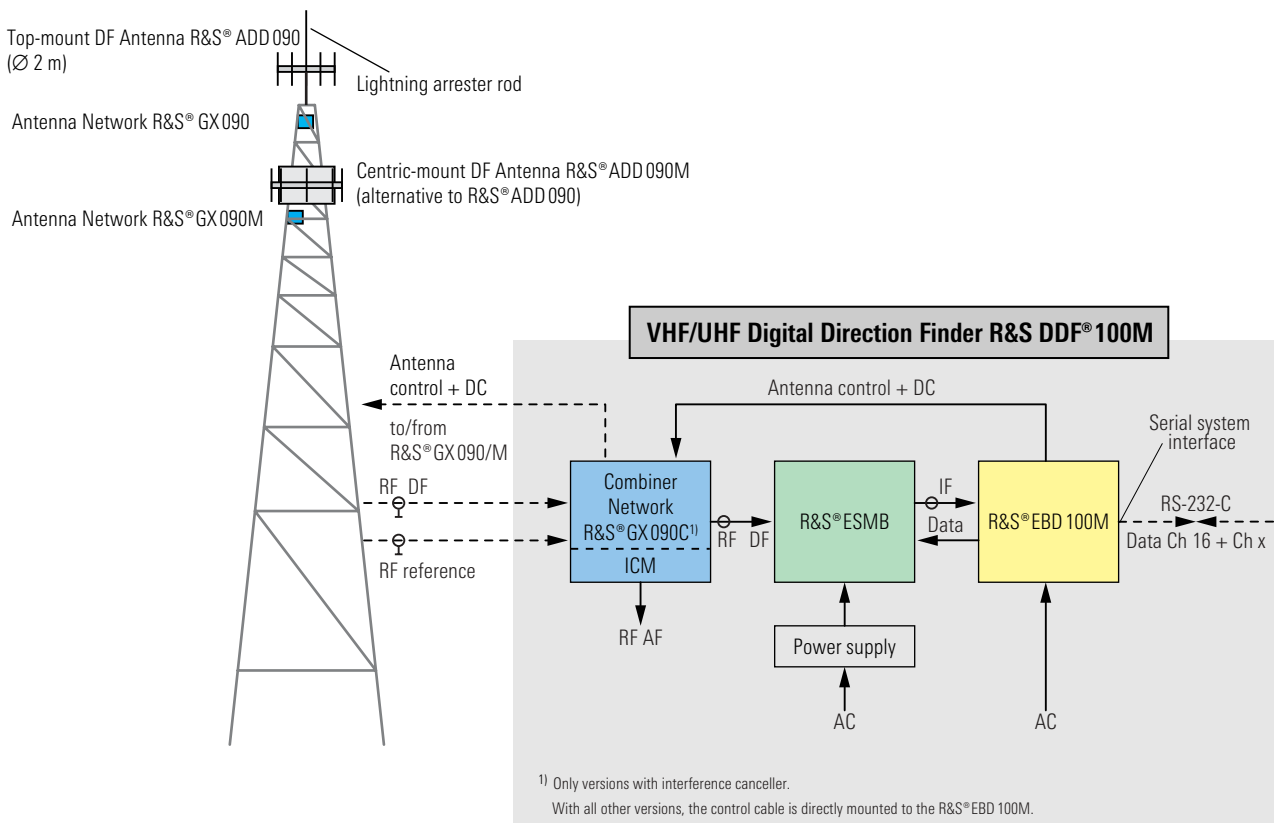
The Digital Direction Finder R&S DDF® 100M can be operated or remote-controlled via a serial RS-232-C interface.

Software R&S DDF® 1M-CTL (option) is to be installed on the computer in the operational center. It allows the presentation of the DF results for the two frequency channels that are used in the switchover process. This software also comes with each direction finder so that service personnel can operate the direction finder on site during installation and maintenance. The free-of-charge operation is limited to 15 minutes.

To operate R&S DDF® 1M-CTL the RAMON Basic Module R&S® RA-BASIC has to be installed.



Graphical user interface (GUI) for the R&S DDF® 100M



DF antennas

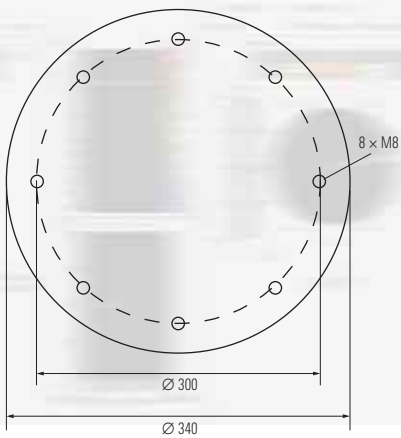
For the R&S DDF® 100M, the two DF Antennas R&S® ADD 090 (diameter 2 m, installation on top of a mast) and R&S® ADD 090M (installation around a mast) are available for stationary applications covering the frequency range 118 MHz to 250 MHz. The antenna cables can be delivered in various lengths on request.



VHF DF Antenna R&S® ADD 090



VHF DF Antenna R&S® ADD 090M



Dimensions of flange

Specifications

DF method	correlative interferometer
Frequency range	118 MHz to 250 MHz
Polarization	vertical
DF accuracy in reflection-free environment ¹⁾	<1° RMS (R&S®ADD090) <1.5° RMS (R&S®ADD090M)
Operating modes DF1, DF3 DF2	single frequency channel quasi-simultaneous direction finding on two channels
Minimum signal duration	100 ms (version without interference canceller in DF1) 600 ms (version with interference canceller in DF3)

DF sensitivity ($\leq 2^\circ$ RMS fluctuation, 1 s signal duration, 15 kHz bandwidth)	5 μ V/m, cable loss <3 dB
Bandwidth (internal)	15 kHz
Resolution of A/D converter	16 bit
IF input to R&S®EBD 100M	10.7 MHz, 50 Ω , level <0 dBm unregulated (i.e. without AGC)
Data interface (R&S®EBD 100M)	RS-232-C for remote control of the system, second serial interface for receiver control

¹⁾ Sample divided up equally across azimuth.

General data

	DF Processor R&S® EBD 100M and Combiner Network R&S® GX090C and Receiver R&S® ESMB	DF Antennas R&S® ADD090(M) and Antenna Network R&S® GX090(M)
Operating temperature range	-10°C to +55°C	-40°C to +65°C
Storage temperature range	-40°C to +70°C	-40°C to +85°C
Permissible humidity	max. 95% cycl. test at 25°C/55°C acc. to DIN EN 60068-2-30	
Mechanical resistance Vibration Sinusoidal Random Shock	5 Hz to 55 Hz, 0.15 mm amplitude, acc. to DIN EN 60068-2-6 10 Hz to 500 Hz, 1.9 g (rms), acc. to DIN EN 60068-2-36 40 g shock spectrum, acc. to DIN EN 60068-2-27	
Class of protection		IP 55, acc. to DIN EN 40050
Lightning protection		against direct lightning strokes acc. to IEC 1024-1, class of protection IV, (i = 100 kA, di/dt = 100 kA/ms)
EMC	acc. to EN 50081-1, EN 61000-6-2, EN 55022 class B	
Power supply AC DC	100/120/230/240 V AC, +10%/-12%, 47 Hz to 440 Hz 10 V to 32 V, 20 W	40 VA, over voltage-protected, acc. to VDE 160 18 V DC, max. 0.3 A (from DF Processor R&S®EBD 100M for cable lengths ≤ 300 m)
Maximum wind speed		275 km/h (without ice deposit) 210 km/h (with 3 cm radial ice deposit)
Dimensions (W × H × D)	R&S®EBD 100M: 219 mm × 147 mm × 460 mm R&S®ESMB: 210 mm × 132 mm × 460 mm R&S®GX090C: 470 mm × 180 mm × 400 mm	R&S®ADD090M (centric-mount antenna): diameter 2.5 m, height 1.5 m R&S®ADD090 (top-mount or side-mount): diameter 2 m, height 0.8 m (with lightning rod: 2 m)
Weight	DF Processor R&S®EBD 100M: approx. 10 kg Combiner Network R&S®GX090C: approx. 6 kg Receiver R&S®ESMB: approx. 8 kg	R&S®ADD090M: approx. 157 kg R&S®ADD090: approx. 40 kg (including lightning rod) Antenna Network R&S®GX090(M): approx. 10 kg

Ordering information

Designation	Type	Order No.
Digital Direction Finder (with DF Antenna R&S® ADD090, without interference canceller)	R&S DDF® 100M1	4064.0120.12
Digital Direction Finder (with DF Antenna R&S® ADD090, with interference canceller)	R&S DDF® 100M1	4064.0120.22
Digital Direction Finder (with DF Antenna R&S® ADD090M, without interference canceller)	R&S DDF® 100M2	4064.0120.14
Digital Direction Finder (with DF Antenna R&S® ADD090M, with interference canceller)	R&S DDF® 100M2	4064.0120.24
Accessories		
Antenna connecting cable		on request
Device Control for R&S DDF® 100M	R&S DDF® 1M-CTL	3020.8835.02
RAMON Basic Module	R&S® RA-BASIC	3020.9490.02



More information at
www.rohde-schwarz.com
(search term: DDF100M)



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www.rohde-schwarz.com

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